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 (72) Inventors ANTHONY NELSON SHARPE
 ADRIAN KEITH JACKSON



(54) DEVICES FOR BLENDING MATERIALS

(71) We, UNILEVER LIMITED, a company organised under the laws of Great Britain, of Unilever House, Blackfriars, London, E.C.4, England, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to devices for blending materials e.g. mixing components of a mixture or homogenising single components. The materials may be liquids or semi-liquid matter, and in some cases solids, or powders or even gases. The invention is particularly concerned with the preparation of samples for bacteriological or chemical testing, but may also be used for the preparation of blended foods for example batters, pastries, sauces, baby foods and for the mixing of glues or paints or animal feeds additives.

Conventionally such materials are mixed in devices known as "liquidisers" or blenders consisting of a container usually standing on top of an electric motor and having two or three paddle/blades within the container which are driven at high speed by the motor to sub-divide and intimately mix the contents of the container. Such devices are relatively costly, particularly where high standards of bacteriological cleanliness are required, and, in the preparation of bacteriological samples, have to be stripped down and cleaned before and after use and even heat sterilised in some cases. In laboratories where bacteriological testing is carried out on a relatively large scale, a large stock of these devices is required so that sufficient samples can be processed in any working day. The present invention is concerned with providing a mixing device which is simpler, cheaper and quicker to bring into operation, particularly for bacteriology.

[Price 33p]

Accordingly the present invention provides a device for blending materials comprising a holder to hold an open mouth bag containing a material to be blended, kneading means which is arranged to apply a kneading action to the bag walls to homogenise its contents, and an elongate clamp which is arranged to transversely clamp across the bag mouth in order to carry the bag and capable of providing a temporary seal to the bag during kneading. Thus, in the device in accordance with the invention no moving parts are required within the container within which the sample is carried and a cheap form of container which can be discarded after use may be used. For example a stock of plastic bags may be carried and the whole stock may be heat sterilised before use and then each one in turn may be discarded after it has been used. One advantage of this is that a stock of such bags takes up so little space; 1,000 bags may form a pile less than 15 cms high and is inexpensive. Moreover sterilisation for re-use is simply a question of replacing the bag.

Preferably the device comprises a backing plate which co-operates, preferably by being pivoted, with said clamping means to clamp the bag and is arranged to support the bag against the action of the or each beater during kneading. The plate may carry a resilient covering e.g. of rubber, to absorb shocks during kneading.

Preferably for the mixing of food and bacteriological samples and powders the device comprises a pair of beaters having operational surfaces parallel to said backing plate which act on different areas of the container and are arranged to provide kneading actions while mutually out of phase. Thus, material in the container will be forced continually from one area of the bag into the other and then back again

rapidly and thus will be subjected to shearing forces to provide intimate mixing, as well as crushing forces to break down any larger pieces.

5 An embodiment of the invention will now be described by way of example with reference to the diagrammatic drawings accompanying the Provisional Specification in which,

10 Figure 1 shows a schematic view of the device prior to loading, and

Figure 2 shows the device in the loaded state.

Referring to Figure 1 a backing plate 1 is mounted on a vertically upstanding baseboard 2 which also carries the other parts of the device. The device carries beaters 3 and 4 having operational surfaces parallel to said plate and driven in a linear reciprocating motion while mutually out of phase by motors 5 and 6 (these can equally be driven by a single motor with suitable gearing).

The backing plate 1 carries a rubber surface covering 7 to withstand the vibration from the beaters 3 and 4 and a clamping device 8 is provided so that when the backing plate 1 is pivoted to its closed position (Figure 2) a plastic bag 9 is clamped between the backing plate and the clamping means 8.

The device was used to blend a sample for bacteriological analysis. The material to be sampled was put into a fresh bag 9, the bag was placed in position on the backing plate 1 in its open position as shown in Figure 1, and the backing plate was pivoted to its closed position (Figure 2) to clamp the bag in position. Screw clamps (not shown) kept the backing plate in its closed position. The motors 5 and 6 were then started up so as to cause the beaters 3 and 4 to provide a reciprocating movement out of phase against the surface of the bag 8 (the drawing showing the beaters in the mid position). This caused the contents of the bag to be kneaded and subjected to shearing actions through being forced from one part of the bag to another resulting in intimate mixing which provided a homogenised sample.

It will be apparent that the flexible material used for the bag should have sufficient strength to withstand the kneading action from the beaters 3 and 4 and that the force supplied by the motors 5 and 6 should not be excessive. The device can satisfactorily operate on most materials that can be mixed in a liquidiser although

it will be appreciated that certain hard sharp materials, e.g. pieces of bone or hard vegetable such as raw carrot may not be entirely suitable for use within this device.

The present device has a number of advantages over conventional liquidising systems; in particular, sample preparation time is very short and the device does not need re-sterilisation for homogenisation of a further sample, as a fresh bag can be used, making the device ideal where rapid throughput is required. Storage space for bags is negligible — a thousand bags make a pile less than 15 cms high. The bags are so cheap that a large store can always be kept ready for use. The bags are very light and can therefore be used in locations where portability is desirable. The sample and bag can be incinerated immediately after use and the bag may be of a transparent material so that the state of the sample can be readily ascertained. Temperature rise in the bag is insignificant. Noise level is low. The plastic bag is particularly convenient for use in factories where a sample can be readily transported in the bag from a factory line to the bacteriological testing unit.

WHAT WE CLAIM IS:

1. A device for blending materials comprising a holder to hold an open mouth bag containing a material to be blended, kneading means which is arranged to apply a kneading action to the bag walls to homogenise its contents, and an elongate clamp which is arranged to transversely clamp across the bag mouth in order to carry the bag and capable of providing a temporary seal to the bag during kneading.

2. A device according to claim 1 in which said holder is in the form of a backing plate which co-operates with said clamping means for clamping the bag, and is arranged to support the bag against the action of said kneading means.

3. A device according to claim 2 in which said plate carries a resilient covering to absorb shocks during kneading.

4. A device according to claims 2 or 3 in which said kneading means comprises a pair of beaters arranged to act on different areas of the bag while mutually out of phase, and located with operational surfaces parallel to said panel.

5. A device substantially as herein described with reference to the drawings accompanying the provisional specification.

T. G. TRIBE,

Chartered Patent Agent.

FIG. 1.

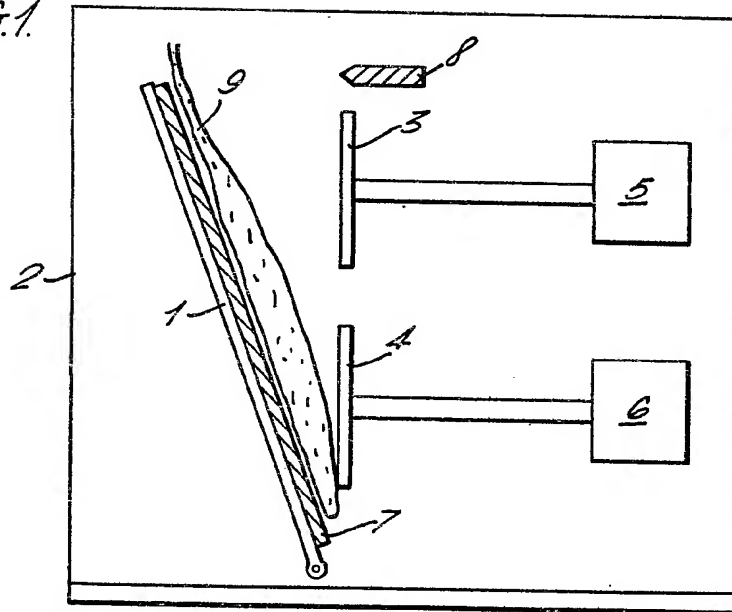


FIG. 2.

